REMARKS

This responds to the Office Action mailed on December 28, 2004.

Claim 1 is amended, no claims are canceled, and no claims are added; as a result, claims 1, 5-6, 9-12, 14-15, 17-22 and 31-33 are now pending in this application.

§103 Rejection of the Claims

Claims 1, 5, 6, 9-12, 14, and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over "Applicant's Admitted Prior Art (AAPA)" and Mitani et al. (U.S. patent No. 6,191,463). Applicant respectfully traverses this rejection.

Mitani apparently discloses a simple polysilicon gate structure over a gate dielectric. Applicant cannot find in the cited portions of Mitani any disclosure, teaching, or suggestion of a polysilicon, barrier layer, metal layer gate stack, as recited or incorporated in the presently rejected claims. Mitani apparently teaches exposing the polysilicon film 222 to a gas mixture of oxygen and NF_3 at 600 to 1000 °C at 10 mTorr to 1 Torr pressures. (See Mitani at column 41, lines 14-16 and lines 28-31.) If a structure such as disclosed in the "AAPA" were subjected to such treatment, Applicant submits that the metal layer would oxidize or vaporize, thus destroying the device, or at least severely contaminating the device with metal impurities. Further, the relatively large amounts of the halogen gas would result in etching of the gate oxide 214 in those portions of the gate oxide not covered by the poly gate 222, as expressly noted in the present application. (See, e.g., Application at page 13.) This result is not a problem for Mitani, which is directed towards insertion of fluorine into the channel region. However, it is incompatible with the present arrangement, which as noted in Figure 5 and on page 12 of the present application, has repaired the sidewalls and edge of the gate stack (such as, for an illustrative example, the poly "smile" 30 and sidewall 28). Thus, Mitani, whether taken alone or in any combination with the "AAPA," would result in a non-functional device.

Specifically, Applicant respectfully submits that the suggested combination of references of the "AAPA" with Mitani fails the previously noted requirements of *In re Gordon*. If the proposed modification (in this case the use of large amounts of a fluorine containing gas at high temperatures and low pressure) renders the reference being modified unsatisfactory for its

intended purpose, then there can be no suggestion of motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984).

Moreover, Mitani is directed to a different problem than the one solved by the presently rejected claims, which have been amended to recite or incorporate "*oxidizing the patterned gate stack under conditions that reduce redeposition on the substrate and on the gate stack of a volatilized portion of the metal film*". Mitani cannot provide any motivation to combine to solve a problem that is not even addressed in Mitani. Thus, Applicant submits that the suggested combination of references is inappropriate, even if such a combination did not result in a nonfunctional device, and uses inappropriate hindsight to solve a problem not conceived of in either of the suggested references. Applicant further submits that the suggested combination of references is not "reasonably pertinent to the particular problem with which the inventor was concerned" as required as shown in the case of *In re Oetiker*, discussed previously. In view of the above, Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Claims 17-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over "Applicant's Admitted Prior Art (AAPA)" and Mitani et al, as applied to claims 1, 5, 6, 9-12, 14, and 15 above, and further in view of Cunningham (U.S. Patent No. 6,479,362). Applicant respectfully traverses this rejection.

The cited references of the "AAPA" and Mitani have been discussed above. Cunningham is used in the outstanding Office Action to show that the use of polysilicon sidewalls and metal nitride barrier layers in a polycide gate is known. Applicant respectfully submits that Cunningham does nothing to cure the above noted failures of the "AAPA" and Mitani references to provide any motivation to make the suggested combination. There is still no indication of a metal film in a gate stack that may contaminate the semiconductor surface by volatilizing during passivation, even assuming that the result of the suggested combination was not a non-functional device, as discussed above. Cunningham cannot provide the required motivation to combine the cited references because, among other things, Applicant submits that its silicide films would not exhibit the volatilization behavior of metal films, but would exhibit much larger sheet resistances than metal films. Applicant respectfully submits that the suggested

combination of references does not meet the requirement for motivation to make the suggested combination, and requests that this rejection be reconsidered and withdrawn.

Claims 31-33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over "Applicant's Admitted Prior Art (AAPA)" and Mitani et al, as applied to claims 1, 5, 6, 9-12, 14, and 15 above, and further in view of Jain et al. (U.S. Patent No. 6,613,682). The cited references of the "AAPA" and Mitani have been discussed above. Jain apparently uses halogen-containing gases during gate patterning to remove a temporary coating. Jain apparently uses a dielectric anti-reflective coating ("DARC") that needs to be removed during gate electrode etching, due to the dielectric nature of the DARC adversely affecting device performance.

Applicant respectfully submits that Jain does nothing to cure the failures of the suggested combination of the "AAPA" and Mitani, as discussed above, to provide a motivation to make the suggested combination. Since Jain is directed toward a simplified DARC removal process that uses a halogen-containing gas during gate etching, there is no possible suggestion to use the halogen-containing gas to prevent redeposition of a volatized metal film during a gate oxidation process. Applicant submits that there can be no motivation to look for a solution to a gate oxidation problem in a gate patterning and plasma etching operation. Applicant respectfully submits that the suggested combination of references does not meet the requirement for motivation to make the suggested combination, and requests that this rejection be reconsidered and withdrawn.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, David Suhl, at (508) 865-8211 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

FERNANDO GONZALEZ ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(508) 865-8211

Date 2/28/05

By David Suhl
David Suhl
Reg. No. 43,169

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 28 day of February, 2005.

Tina Kohut
Name

Signature